

QUESTION #5

ATTACHMENT #3

Instructions	
<b>Pressure Loss Volume Sheet</b> This is the volume that is lost when going from pumping line pressure to post leak line pressure.	Step 1: Establish Segments
	Step 2: Segments should start and stop at any isolation point used after the release. For example, stations would be starting and stopping points. If there are any mainline valves in between stations that were closed after the release, these must also be included as starting and stopping points for segments.
	Step 3: Using pressure transmitter data from Data Historian at the stations and at each isolation valve, record pressures as listed just prior to the release.
	Step 4: Review alignment sheets to determine if pressure transmitter locations are at approximate mean altitude for the segment (+/- 50 ft)
	Step 5: Looking at Data Historian, list the pressure for each segment after it equalizes and "flatlines" after the release and isolation events have occurred.
	Step 6: Have Chuck Hart calculated the volume lost using the pressure differences in each segment.
<b>Pumping Volume Sheet</b> This is the volume lost from product continuing to be metered out of the origination station due to pumping.	Step 1: Determine time of release from Data Historian or Operations Control event log
	Step 2: Determine time that units were shut down or the time that metering stops at both pump and receive location
	Step 3: Determine metered volume during this time period leaving the origination station.
	Step 4: Determine metered volume during this time period entering the receiving station.
	Step 5: Insert support data from data historian to show pump sequencing and metering values used.
<b>Drain Down Volume Sheet</b> This is the volume lost due to the drain down that occurs after pressure has dissipated and pumping has stopped (due to gravity and elevation).	Step 1: Determine the time that repack of the line began from Operations Control.
	Step 2: Determine the time that pressure at both ends of segment being repacked begin to rise uniformly.
	Step 3: Record volume metered during this time.
	Step 4: Insert support data from data historian to show line repack times, pressures and metered barrels.
<b>Other Volume Sheet</b> This is the volume removed from the pipe or the system during the release that should not be attributed to the release volume.	Step 1: Consult maintenance crew to determine if vacuum truck was used to remove any product from the line during remediation.
	Step 2: Determine if any product was redirected to another location or tank.
	Step 3: Consider all possibilities of volumes that shouldn't be contributed to the release or additional volumes from another source that is not considered.

Result Summary	
Pressure Loss Volume	190.9688
Pumping Volume	-60
Drain Down Volume	2160
Volume removed (not attributed to release)	-107.1429
TOTAL VOLUME OF RELEASE	2183.826

#5-12"

Result Summary	
Pressure Loss Volume	42.1108
Pumping Volume	-30
Drain Down Volume	792
Volume removed (not attributed to release)	-154.7619
TOTAL VOLUME OF RELEASE	649.3489

#3-8"

#5-12"

Pressure Loss Volume Component for Leak Volume Calculation

4/30/2012

Pressure Prior to Release (psig)							Pressure After the Release (psig)								
Segment #	From MP	To MP	Upstream	Downstream	Average	Average (Flatline)	ID approx	B/Ls in Segment	Density @60 deg F (API)	Spec Grav @ 60 g/cc	Temp.	F	Cpl Prior	Cpl After	Volume Lost (bbl)
1	96.35	142.9	999	462	730.5	34	12.25	35.829	60.0	0.73817	60.0	0.761	1.00539	1.00026	(197)
2					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
3					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
4					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
5					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
6					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
7					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
8					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
9					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0
10					0		12.25	0	60.0	0.73817	60.0	0.761	1.00000	1.00000	0

FC to NC

Total Volume Lost due to Pressure Loss -190.9667953

FC to NC

3/10

Pumping Volume Component for Leak Volume Calculation

4/30/2012

Time of release		10:50
Time all units are shut down		10:56
Metered volume during this time	Upstream station	192
	Downstream station	252
Difference in metered volumes		-60

or flow stops at upstream and downstream meters.

bbls

bbls

bbls

more went into Sioux City and Omaha?

Input by user
Total Volume for Page

Drain Down Component for Leak Volume Calculation

4/30/2012

Line Repacking

Time Started	11:26
Time pressure indications at various points begin to increase	12:34
Volume pumped during this time	2160

127177688  
127179848

Input by user
Total Volume for Page

#5-12"

Summary of Other Volumes

4/30/2012

Volumes removed via vac truck or other means  
**Total Volume to be removed from release volume**

107  
107

Input by user  
Total Volume for Page

Pressure Loss Volume Component for Leak Volume Calculation

4/30/2012

Pressure Prior to Release (psig)			Pressure After the Release (psig)									
Upstream	Downstream	Average	Average (Flatline)	ID approx	BLL's in Segment	Density @60 deg F (API)	Spec Grav (@ 60 g/cc)	Temp.	F	Cpl Prior	Cpl After	Volume Lost (bbl)
1039	96.5	567.75	32	8.125	16.134	33.0	0.85933	60.0	0.486	1.00277	1.00016	(42)
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0
		0		8.125	0	33.0	0.85933	60.0	0.486	1.00000	1.00000	0

FC to NC

Total Volume Lost due to Pressure Loss -42.11079919

Calculated by Bernoulli's Equation
Input by user
Total Volume for Page



Pumping Volume Component for Leak Volume Calculation

4/30/2012

	Time of release		10:50
	Time all units are shut down		10:56
Metered volume during this time	Upstream station	64	bbls
	Downstream station	94	bbls
Difference in metered volumes		-30	bbls

metered more into Doniphan than out of KC

or flow stops at upstream and downstream meters.

Input by user
Total Volume for Page

Drain Down Component for Leak Volume Calculation

4/30/2012

Line Repacking

Time Started	9:07
Time pressure indications at various points begin to increase	10:07
Volume pumped during this time	792

91769800  
91769008

Input by user
Total Volume for Page

#3-8"

Summary of Other Volumes

4/30/2012

Volumes removed via vac truck or other means	155	Input by user
Total Volume to be removed from release volume	155	Total Volume for Page

**EPA Request for Information  
Magellan Pipeline Company, L.P.  
Mile Post 110 #3-8" and #5-12" Pipeline Strikes  
Nemaha County, Nebraska**

**QUESTION 5:**

Magellan reported a total volume of 2,834 barrels (bbls) of refined petroleum products released at the site. The totals for the different products released are as follows:

- #5-12 pipeline: 1,529 bbls of gasoline and 655 bbls of jet fuel
- #3-8" pipeline: 650 bbls of diesel fuel

To date, approximately **252 bbls** of product have been recovered at the site as follows:

- **Approximately 80 bbls** of product were recovered from recovery sumps installed from depths of approximately 12 to 17 feet (ft) below ground surface. Product was recovered via vacuum trucks, transported to the Magellan Reclamation Facility in Kansas City, Kansas, and temporarily stored in an above ground storage tank (AST) at the facility.
- **Approximately 172 bbls** of product were recovered from the unnamed tributary. Peat moss and absorbent boom were used to recover product from the surface water body. The volume of product recovered was determined based on the absorptive capacity of peat moss and absorbent boom and the total amount used.

Peat: One bag contained 17 pounds (lbs) of peat moss. According to the manufacturer, it takes two lbs of peat to recover 1 gallon of product. To date, 480 bags of peat have been used to recover product from the unnamed tributary. In order to provide a conservative estimate, a factor of 50% was applied to the calculated total; therefore, approximately 2,040 gallons (48.6 bbls) of product were recovered via peat moss.

Boom: The absorbent boom used at the site came in 10 ft sections. According to the manufacturer, the absorptive capacity of each 10 ft section of boom was 12 gallons of product. To date, 861 10 ft sections of absorbent boom have been used at the site. In order to provide a conservative estimate, a factor of 50% was applied to the calculated total; therefore, approximately 5,166 gallons (123 bbls) of product were recovered via absorbent boom.

An unknown volume of the released product evaporated. Calculations to determine the approximate volume of product released to the air were not completed.

To date, approximately 252 of 2,834 bbls of product have been recovered at the site. An unknown volume of product evaporated; therefore, the maximum volume of product remaining at the site is approximately 2,582 bbls.